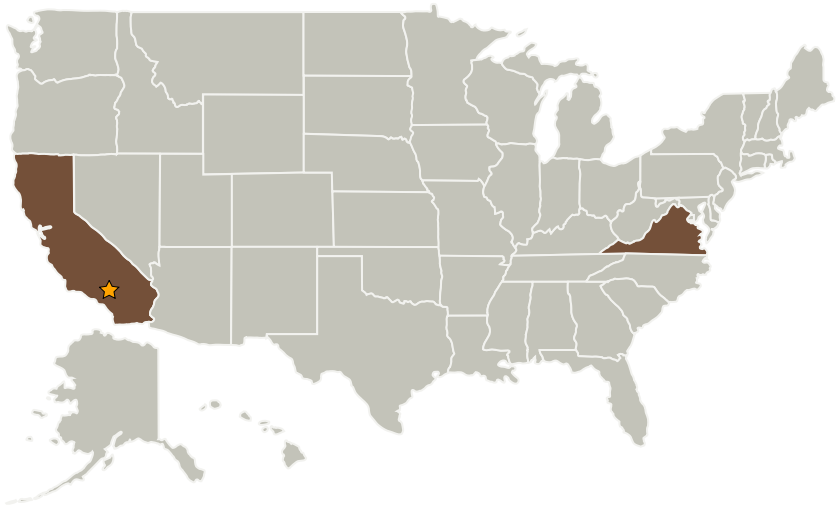
Self-Assembled Nanostructured Health Monitoring Sensors, Phase I

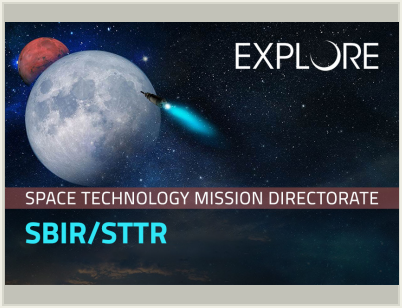
Completed Technology Project (2004 - 2004)

Project Introduction

The objective of the proposed NASA SBIR program is to design, fabricate and evaluate the performance of self-assembled nanostructured sensors for the health monitoring of advanced aerospace materials and structures. NanoSonic would work with a major U.S. research university and a large U.S. aerospace company to develop such sensor materials based on molecular-level self-assembly processes. NanoSonic?s prior research has shown that thin film materials having a wide range of controlled constitutive properties may be formed by its patented electrostatic self-assembly synthesis techniques. Specifically, electrical and thermal conductivity, permeability, permittivity, elastic modulus, chemical reaction, molecular transport and other properties may be integrated into bulk materials, graded through the thickness of such materials, or patterned in two dimensions in thin planar materials. The ranges of values of the corresponding constitutive parameters are determined by the specific molecules that are self-assembled, and their order through the thickness of the material. Through the proposed program we will extend this work to form similar materials that change their properties in response to external environmental changes and thus act as sensor elements. Such elements may be directly integrated into aerospace composite materials and/or attached to large structural components as part of onboard health monitoring systems.

Primary U.S. Work Locations and Key Partners





Self-Assembled Nanostructured Health Monitoring Sensors, Phase I

Table of Contents

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Armstrong Flight Research Center (AFRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Small Business Innovation Research/Small Business Tech Transfer

Self-Assembled Nanostructured Health Monitoring Sensors, Phase I

Completed Technology Project (2004 - 2004)

Organizations Performing Work	Role	Type	Location
★Armstrong Flight Research Center(AFRC)	Lead Organization	NASA Center	Edwards, California
Nanosonic, Inc.	Supporting Organization	Industry	Pembroke, Virginia

Primary U.S. Work Locations	
California	Virginia

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Jennifer H Lalli

Technology Areas

Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
  - TX12.1 Materials
    - TX12.1.6 Materials for Electrical Power Generation, Energy Storage, Power Distribution and Electrical Machines